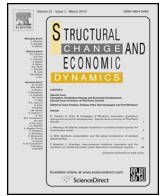




Contents lists available at ScienceDirect

## Structural Change and Economic Dynamics

journal homepage: [www.elsevier.com/locate/sced](http://www.elsevier.com/locate/sced)



# How money drives US congressional elections: Linear models of money and outcomes

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### ARTICLE INFO

#### Article history:

Received 30 May 2019

Received in revised form 5 September 2019

Accepted 15 September 2019

Available online xxx

#### Keywords:

Political money

Regulation

Elections

Political economy

United States government

Campaign finance

### ABSTRACT

This paper analyzes whether money influences election outcomes. Using a new and more comprehensive dataset built from government sources, the paper shows that the relations between money and votes cast for major parties in elections for the U.S. Senate and House of Representatives from 1980 to 2018 are well approximated by straight lines. It then considers possible challenges to this “linear model” of money and elections on statistical grounds, resting on possible endogeneity arising from reciprocal causation between, for example, popularity and votes. The paper develops a spatial Bayesian latent instrumental variable model to tackle this much discussed problem. It checks its results by studying relations between changes in gambling odds and contributions in key elections. Both approaches suggest that reciprocal causation may happen to some degree, but that money’s independent influence on elections remains powerful.

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“Because many interests come into play in the financing of an election campaign and then they ask you to pay back. So the election campaign should be independent from anyone who may finance it.”<sup>1</sup> Pope Francis

### 1. Introduction

The “Occupy” protesters who swirled into parks, churches, and town squares around the world in the fall of 2011 to challenge the primacy of the “1%” hammered relentlessly on one theme above all others: that economic inequality has deep roots in a money-dominated political system. It was a message that resonated across the political spectrum: adherents of “populist” protest movements in Europe and groups like the “Tea Party” in the United States often voiced similar sentiments<sup>2</sup>.

The clamor inspired prominent social scientists and intellectuals to look afresh at key issues long regarded as settled in their disciplines. Many, in particular, voiced misgivings about whether it made sense to so sharply compartmentalize discussions of economics and politics. Piketty, in his influential study of the distribution of wealth and income, for example, avowed that the subject was in the end a question of “political economy” rather than pure economics (Piketty, 2014). Stiglitz in *The Price of Inequality* was equally forthright – for him income inequality had a fundamental political dimension: “increasingly, and especially in the United States, it seems that the political system is more akin to ‘one dollar one vote’ than to ‘one person one vote.’” (Stiglitz, 2013).

But concrete analyses of how political power combines with economic forces are few and far between, not only in these exemplary works, but almost everywhere else. In the social sciences, old habits, especially if they derive in part from the Cold War, do not die simply because someone thinks they should. Disciplinary lags powerfully aid this research stagnation: Historians routinely ignore economics and even after 2008, despite much talk, economics still mostly turns a blind eye to history. Indeed, our observation is that formal appointments in economic history inside economics departments have become ever scarcer. Political science, for its part, fails to take advantage of newer techniques such as event analysis and resists the steadily growing empirical evidence about party and candidate differences in investor coalitions – clearly because that

<sup>1</sup> Pope Francis, quoted in *Ansa en Vatican*, March 10, 2015; available on the web at [http://www.ansa.it/english/news/vatican/2015/03/10/pope-calls-for-free-election-campaigns\\_35296d5c-c578-4ea4-babe-e9cb9f520bb1.html](http://www.ansa.it/english/news/vatican/2015/03/10/pope-calls-for-free-election-campaigns_35296d5c-c578-4ea4-babe-e9cb9f520bb1.html). The original has an extra quotation mark in the middle, which appears to be a misprint. Note that this is a report of the Pope’s interview with a Brazilian slum newspaper and not the original.

<sup>2</sup> On the cross-spectrum importance of corruption as an issue, see, e.g., (Heinrich, 2017), though it seems clear that the use of “populism” there is really directed at what might be termed “right populism.”

would require recognizing that such coalitions exist.<sup>3</sup> Neither field encourages serious archival research, which is likely the richest source of the kind of evidence that is needed.

But these clouds come with a silver lining. In the new Gilded Age, many features of the political landscape point so obtrusively to the dominance of the superrich that the real state of affairs is hard to miss without special training: \$100,000 a plate fundraising dinners to kick start presidential campaigns, Secretaries of the Treasury whose pockets bulge with bonus payments from past employers if they leave for “public service”; revolving doors between Congress and the private sector that whirl 24/7; or the surge in Congressional incomes, stock portfolios, campaign expenditures, loans, and perks since the sixties – these are facts that no amount of spin can hope to efface.<sup>4</sup>

Still, the paucity of empirical accounts of how social class, industrial structures, and big money directly translate into political dominance at the ballot box holds the door open to much mischief. In the US, especially in election years, a kind of unholy alliance obtains between mainstream figures in both economics and political science. As spending on campaigns breaks all records, Super PACs proliferate down to state and local levels, and corporations pour money into 527s and any numbers of other vehicles, they steadfastly insist that seeing should not lead to believing.<sup>5</sup> Thus Tyler Cowen, a prominent advocate of “public choice” economics, for example, asserts “For all the anecdotal evidence, it’s hard to show statistically that money has a large and systematic influence on political outcomes” because “any politician who strays too far from voters at the philosophical center will soon be out of office.” (Cowen, 2010, see also Cowen, 2018).

In fact, there is a dynamic that pushes politicians to embrace the preferences of the typical or “median” voter, who sits squarely in the middle of public opinion. A significant move to either the left or the right would open the door for a rival to take a more moderate stance, win the next election and change the agenda. Politicians will respond to this dynamic, whether they are power-seeking demagogues or more benevolent types who use elected office to help the world (Cowen, 2010).

Others assuage doubters with reassurances that several generations of work in political science indicates that money just does not matter very much in elections. A study by an economist commissioned by the Campaign Finance Institute/BiPartisan Policy Center Working Group on the Money in Politics Research Agenda reports “something of a scholarly consensus at least for campaign spending in congressional races. However this consensus stands in stark contrast to the popular wisdom echoed by pundits, politicians, and reform advocates that elections are essentially for sale to the highest bidder (spender). Decades of social science research consistently reveal a far more limited role for campaign spending” (Milyo, 2013).

<sup>3</sup> See, e.g., the tables in (Ferguson et al., 2013) or (Ferguson, 1995). For event analysis, see, e.g., (Faccio, 2006) and (Ferguson and Voth, 2008).

<sup>4</sup> For the Treasury Secretary bonus and revolving doors, see, e.g., (Bloxham, 2014); (Vidal et al., 2012); for stocks and tips, see (Ziobrowski et al., 2004) and (Ziobrowski et al., 2011), though see also the discussion in Ferguson et al. (2017). (Tahoun and Vasvari, 2016) show how bank lending to members of Congressional committees supervising financial institutions immediately jumps when they begin serving on these committees.

<sup>5</sup> “527”s take their name from a section of the tax code; they are allowed to receive unlimited amounts of money from any source and spend that money for political purposes. Supposedly they promote issues rather than candidates. In practice the distinction is close to meaningless. Prominent examples of 527s include the Republican Governors Association and Democratic Governors Association, both of which receive large amounts of corporate dollars. Since 527s report to the Internal Revenue Service and not the Federal Election Commission (and the two organizations’ reporting systems are incompatible), they are commonly ignored in many analyses of election funding.

Mainstream analysts are nothing if not consistent. Over the last few decades, many have argued that American politics would be better off if more money flowed to political parties (rather than “outside” independent groups that do not formally affiliate with any party but spend heavily on elections). Such claims have provided cover for leaders of both major parties to dismantle one barrier after another to the political system’s equivalent of crack cocaine or fentanyl. Their efforts also distract attention from the obvious question why all those nice people in expensive suits and dresses keep pouring money into the political system while often going to great lengths to disguise their efforts.<sup>6</sup>

Thus reassured, journalists pitch in, sometimes after pausing to pat themselves on the back for courageously defying conventional wisdom. Often, our research suggests, at just about the point in campaigns where the size distribution of political contributions swells to elephantine levels, pundits extoll the importance of small donors to political campaigns – claims that are often fewer number of cases makes the precision of the Senate stoked by interested politicians, whose actual fundraising records show very clearly that they know better.<sup>7</sup> In recent years, social scientists who claim to know have added a new twist: Acknowledging that some very large donors – such as the famous Koch brothers – cluster at the extremes of the political spectrum, they nevertheless insist that such individuals are unrepresentative of the corporate mainstream. America’s large firms, runs the line, tend to the political center. Supporting candidates of movements like, for example, the Tea Party, is not their thing; major corporations do not stoop to conquer.<sup>8</sup>

Several years ago we began publishing research indicating that such views were badly mistaken (Ferguson et al., 2013, 2018b). Drawing on a new data base that unified the separate reporting systems of the Federal Election Commission (FEC) and the U.S. Internal Revenue Service (IRS), we looked in detail at patterns of corporate giving in presidential contents. Inspired by an “investment” approach to political competition emphasizing the “money-driven” character of contemporary political systems, we also looked at Congressional elections.<sup>9</sup> Here we broke with customary practices of

<sup>6</sup> See the sample of views put forward in the symposium prefaced by (Krasnow, 2004); also (La Raja, 2013). This campaign for still more money for the parties was recently crowned with success. A provision in a bill passed with support from both the White House and Congressional leaders in December 2014 vastly expanded the amount of money parties can collect. This was part of the same measure gutting the most important provision of what was left of the Dodd-Frank financial reform legislation. See the discussion in, e.g., (Burnham and Ferguson, 2014). For the party financing changes, see, e.g. (Parti and Pallmer, 2015). Note that Tea Party representatives strongly opposed the provision as an effort by the GOP establishment to weaken them, which is exactly what it was. Democrats supported the measure for the usual reasons; in neither case were desires to turn back power to the people at all relevant. At the time, we dismissed the idea that expecting more money from millionaires would make parties more responsive to average citizens. The 2016 election seems to us to vindicate that skepticism.

<sup>7</sup> See for references and discussion of the Obama campaign, (Ferguson et al., 2013). As the 2020 campaign heats up, Democratic Party candidates for the presidency and party leaders are once again touting their reliance on small donations and refusal to accept corporate PAC money. Both of these gestures are meaningless in real terms. See the quantitative assessment in (Ferguson et al., 2018a).

<sup>8</sup> See, e.g., (Drutman, 2015); on the academic side, see, e.g., (Bonica, 2013).

<sup>9</sup> The investment approach builds on a single, simple point: that only campaign appeals that can be financed can be brought before electorates. This implies the rejection of median voter approaches to analyzing elections, which slip past this basic point. No matter how many voters might profit from a policy proposal, they will not hear or see it unless what Ferguson termed the minimum “campaign cost condition” can be satisfied (Ferguson, 1995). When voters face high transactions and information costs, the approach leads naturally to treatments of party competition in which power passes by default to organized blocs of investors and industries which can bear those costs. This approach links easily to earlier treatments of the political significance of industrial structure put forward on both the right and the left, including (Kehr, 1977, 2012); (Gerschenkron, 1962, 1966); (Rosenberg, 1939, 1991); and (Kurtz, 1984). The investment view has obvious affinities with the literature on “structural change” (e.g., Landesmann, 2018), though developing them would take

sorting out how incumbents or challengers fared in favor of direct tests of the global relation of campaign expenditures to outcomes, trying to take better account of total spending in campaigns, including the burgeoning flows of “independent” and “electioneering” spending by outside formally non-party affiliated groups.

Our results surprised even us, so initially we devoted considerable space to reciting the usual litanies about the pitfalls of confusing correlation and causality. We found that in three widely spaced years – 1980, when the U.S. Congress functioned very differently than it does today, 1996, and 2012 – the relation between major party candidates’ shares of the two party vote and their proportionate share of total campaign expenditures were strongly linear – more or less straight lines, in fact. The relationship was strong for the Senate and almost absurdly tight for the House.<sup>10</sup>

We also exploited our new, unified dataset to identify contributors whose names and addresses differed, but who were in fact the same people, and linked them to businesses they managed or controlled to produce far more accurate estimates of the true concentration of campaign contributions. We demonstrated, for example, that the top 1% of U.S. income earners – defined quite carefully – dominated both major parties; at the same time, however, our results once again confirmed the huge differences in the extent to which specific sectors and blocs of firms within big business differentially support Democrats or Republicans (Ferguson et al. 2013). The results point up the futility of trying to understand the dynamics of American politics without reference to investor coalitions and strongly support a broad investment approach to party competition.

This paper extends and consolidates our work on Congressional elections and campaign money. The discussion is divided into six major parts. We begin with an overview of what is distinctive about our data in the next Section (2). In Section 3 we show that the basic “linear” model we developed for analyzing our first sample of Congressional elections holds for all but one of them, both House and Senate, from 1980 to 2018. (The single apparent exception, the 1982 Senate elections, is discussed below. By most social science criteria, the model fits very well; the divergence is only relative.) By itself this striking – and strikingly new – result raises basic questions about social science discussions of campaign finance, which overlooked this stark relationship for more than a generation.

In Section 4 the paper tackles the main counter arguments that have been leveled at our findings. We believe that more than a third of a century’s evidence of strong direct relationships between money and Congressional outcomes tells heavily in favor of a broad investment approach to party competition – evidence that few would consider consistent with dismissals of money’s role in elections. But there are, for sure, reasonable counterarguments. In particular, there is one redoubt to which skeptics repair time and again: the possibility that money and votes are reciprocally related. As Jacobson artfully frames the conundrum that protects this escape hatch: “Money may help win votes, but the expectation that a candidate can win votes also brings in money. To the degree that (expected) votes influence spending, ordinary measures will exaggerate the effects of spending on votes (Jacobson, 2013, p. 51).”

Our response to this challenge is twofold. Firstly, we look closely at natural experiments in which it is possible to rule out the presence of much endogeneity. Cases, in other words, in which one can

conclude with confidence that waves of money launched in defiance of impossibly long odds produced dramatic political upsets that can be shown to have been anticipated by scarcely anyone.

We will see that at least two elections qualify as true “out of the money” shockers. One is the famous 1994 electoral sweep in which Newt Gingrich and a Golden Horde of donors stunned the world by seizing control of the House of Representatives for the Republicans for the first time since 1954 (and only the third time since 1932). The second is equally consequential, though its singularity has been lost in the shadow of the even more startling outcome of the presidential campaign that ran in parallel with it: the Senate elections of 2016.

With only weeks to go and the Trump campaign widely considered to be doomed, panic spread among Republican Party leaders and donors. If they lost the Senate, their most powerful check on a President Hillary Clinton would disappear – and as a group their candidates trailed far, far behind the Democrats. It is normal for politicians to cry wolf when they beg for funds, but this time was different. Not only Senate Republican leader Mitch McConnell and his fundraisers, but many of the Republican Party’s most celebrated donors could hear the wolves howling. Many, including super-donors who were sometimes reported to be sitting out the presidential race, responded handsomely. The wave of money they collectively generated dramatically turned around the election and, surveys of individual voters suggest, had an important impact on Trump’s own presidential campaign, which itself was finally pouring vast sums of money – not only the candidate’s own, but a vast infusion of dark money – into the breach.<sup>11</sup>

In both the 1994 and 2016 cases, we are able to do more than ask readers to credit the wealth of contemporaneous testimony and primary sources indicating that these outcomes came as major surprises. To show how long the odds really were our analyses take a leaf from recent studies employing methods of “event analysis” in economics and finance to use published daily estimates of the odds of Republican victories to rule out appeals that many donors really harbored sotto voce expectations of victory.

But 2016 and 1994 represent just two cases, though admittedly historic ones. Few other elections provide such clear cut evidence of the transformative power of big money. In the hope of bypassing tedious debates over myriads of less clear cut cases, we also searched for more general approaches. Section 5.0 of our paper outlines our solution to that problem. Customary econometric techniques for resolving puzzles about reciprocal causation (one of several forms of statistical “endogeneity”) rely on so-called “instrumental” variables. Good instrumental variables, however, are elusive; the criteria are demanding and dismayingly uncertain – in the end, what decides is usually whether anyone can think of compelling reasons why the instrument might be contaminated.<sup>12</sup> Given all the controversies, we would be uneasy in even the best of cases, but there are good reasons for thinking that elections pose peculiarly daunting challenges to applying the method. Even analysts who once were optimistic express increasingly deep misgivings about the welter of claims and counter-claims in the journals (Jacobson, 2006, p. 197; Bartels, 1991).

We suspect that where politics and money is concerned, the search for good instruments is in most instances akin to hunting the Snark. A better approach is to search for estimation methods that do not require us to lean so heavily on thin reeds. This quest

us too far afield. Our view is that literature is currently stronger on what links sectors and firms together than it is on accounting for their political conflicts across sectors or accounting for when and where the workforce organizes successfully into unions and related organizations.

<sup>10</sup> The fewer number of cases makes the precision of the Senate estimates looser and the fit is in any case not as tight. We conjecture that this has something to do with the great publicity Senate races normally attract. One way of regarding the media influence is as a special case of another industrial sector.

<sup>11</sup> See for money in the presidential race, the statistics in (Ferguson et al., 2018b); for the effects of the Senate race financing, see the discussion of American National Election Survey results for the presidential race in (Ferguson, Page, et al. 2018).

<sup>12</sup> See, e.g., (Stock and Watson, 2010). Analysts working on the latent instrumental variable approach discussed below have published especially acute critiques of typical practice. See, e.g., (Park and Gupta, 2012).

led us to the work of Peter Ebbes and his colleagues. They have developed latent instrumental variable (LIV) models into a practical working tool, where the instrument is unknown, and used them to attack a variety of problems in business and economics. Their methods are now widely used in some specialized fields, though not yet well known generally in economics or, a fortiori, political science ((Ebbes, 2004; Ebbes et al., 2005; Zhang et al. 2009; Rutz et al. 2012; Park and Gupta, 2012).

These methods are relatively new and, of course, like all statistical tools, they rely on assumptions for their validity, but those required are no more farfetched than more conventional approaches to tackling the question. Irene Hueter's recent critical review helpfully clarifies important points. Though she raises questions about various second order issues, she concludes that the method appears to be fundamentally sound and to work in practice: the solutions it gives to some classical econometric applications appear reasonable and in line with results using more traditional methods (Hueter, 2016). We have adopted some of her proposed tests and think it is time to try the approach on money and politics, particularly since we can crosscheck its findings with our results on 1994 and 2016, obtained by the completely different approach now conventional in finance.<sup>13</sup>

Our data, however, differ from the cases to which such models have thus far been applied. As discussed below, spatial autocorrelation marks much of our data – for some Senate elections and virtually all House contests. We, accordingly, cannot without checking simply employ an off the shelf model; our tests revealed the presence of spatial autocorrelation of various types. So we developed a spatial latent variable instrumental variable model. Section 5 of the paper estimates such a model using Bayesian (SBLIV – Spatial Bayesian Latent Instrumental Variable) methods. Lest we be misunderstood, the point of this model is not to deny that reciprocal causality happens, but to fix the approximate extent of the endogeneity and arrive at more precise estimates of money's effects in its own right. Our results suggest that for House elections, taking account of spatial autocorrelation reduces the coefficients for the influence of money, but not by that much. They rise back somewhat when the SBLIV model is used, with results for 1994 and 2016 that are consistent with our discussion of those episodes. For Senate elections, the coefficients sometimes rise slightly. All regressions indicate that money has significant effects on electoral outcomes.

## 2. Data on political money

All discussions of campaign money need to begin with the caveat that political money strongly resembles the electromagnetic spectrum: Only slivers of it are visible to the naked eye and even that portion is shrinking as so-called “dark money” proliferates in the electoral system.<sup>14</sup> On the other hand, in the United States, though not everywhere else, the visible part of the spectrum is large and important: analyzing it yields insight into flows of funds that play truly significant roles in the system. The now celebrated category of “Dark Money” – money that anonymous donors launder through public “charities” that are not required to report where the money came from – is less of a threat to many of our inquiries than one

might suppose. Most dark money briefly surges above ground as it transits to super pacs from the alleged “charities” or the “charities” themselves ladle it out. In the latter case, these entities report their spending, if often carelessly, just not who gave them the funds. Inquiries into total spending (the focus of our linear model) are thus not affected, though estimates of donor concentration in the later part of our paper perforce become floors, not ceilings.

For our purposes, the thornier data problems arise from the fragmentation of reporting sources and formats – whose chaotic realities are, we are sure, one major reason why progress has been so slow in understanding campaign finance. Because we have extensively discussed elsewhere the measures we have taken to overcome these problems (Ferguson et al., 2013), our discussion here will be summary, with a more formal presentation relegated to Appendix 2.

The data we use in this study come from our larger Political Money Project. The guiding idea of that effort is to return to the raw data made available by the FEC and the IRS and create a single unified database as far back as the data exist containing all contributions in whatever form for all federal elections. This is a tall order, as anyone familiar with our vastly different data sources will realize. In particular, FEC sources are sometimes jarringly inconsistent; previous analysts do not always appear to recognize the extent of the “flow of funds” problems in this data, nor the pitfalls besetting efforts to track money split up at joint campaign events. Nor are all the contributions in the IRS database available in electronic form for all years.<sup>15</sup> And puzzling gaps and inconsistencies sometimes crop up, when one tries to unify all the databases.

But the real work commences only once this stage is completed. At both the FEC and the IRS, standards for reporting names of both individual and corporate contributors are laughably weak. Both companies and individuals routinely take advantage of regulatory nonchalance about even arrant non-compliance. Along with an enormous number of obviously bad faith reports (such as presidential contributions listed as coming from individuals working at banks that were swallowed long ago by other giants) all sorts of naïve, good faith errors abound in spelling, consistent uses of Jr., Sr., or Mr., Ms., and Mrs., along with myriad incomplete entries and hyphenated names. Many people, especially very wealthy contributors, legitimately have more than one address and fail to consistently list their corporate affiliations (“retired” as a category of contributor is extensively abused; some people who chair giant corporations often claim the status). It does not help that, as we discovered, the FEC has on occasion eliminated important data without publicizing this fact.<sup>16</sup>

From the outset we recognized that solving this problem was indispensable to making reliable estimates of the concentration of political contributions. We adapted for our purposes programs of the type used by major hospitals and other institutions dealing with similar problems, adding many safeguards against tricks that no medical institution ever has to worry about; all the while checking and cross-checking our results, especially for large contributors. In big data efforts, there is never a point where such tasks can be regarded as unimpeachably finished.<sup>17</sup> But we are certain that our data substantially improve over other sources on offer, including rosters of campaign contributions compiled by for-profit companies and all public sources.

<sup>13</sup> We followed Hueter in examining estimated posterior distribution for the latent instrumental variables in our Bayesian models; all looked fine. They are not reproduced in this paper.

<sup>14</sup> For “Dark Money,” see e.g., (Kurth and Mayer, 2016). For the broader “spectrum of political money” see (Ferguson, 2015) and (Ferguson et al., 2017), which offer some estimates of the money value of each category. That discussion is a warning against notions that formal political money is the only important form of money driving policy. See also (Ferguson and Johnson, 2013), Figure 7.3, p. 88, which illustrates how sheer economic inequality can by itself break down formally democratic systems.

<sup>15</sup> (Ferguson et al., 2013). See also Appendix 2 in this paper.

<sup>16</sup> See (Ferguson et al., 2012c); (Ferguson et al., 2012a); (Ferguson et al., 2012b), which also deal with the FEC response. We have checked and the data whose removal we criticized are back in.

<sup>17</sup> Note that by many standards of “big data” even the data sets we use here are fairly small.



Because we can compare many reports filed by people whom we can recognize as really the same person, we are able to see through schemes, such as those encouraged by the Obama campaigns (especially in 2008) to encourage individual contributors to break up contributions into what looks like many “small” donations (Ferguson et al., 2013). We are also able to fill in many entries for workplace affiliation that were left blank. By itself, these steps lead to quantum leaps in the number of contributions coming from the same enterprises. But we have also used business directories and data from the Securities and Exchange Commission to pin down the corporate affiliations of many other contributors, whose identifications, once established, are similarly extendible to other incompletely filled out data entries.

These efforts allow us to take another step beyond existing discussions of political money. We aggregate all the data by “investing units.” For the first time, this brings together contributions from executives, corporate treasuries (especially the often gigantic “527” donations), political action committee contributions, and recognizes that they are all coming from the same companies. Not surprisingly, this move dramatically changes the scale of the political landscape and estimates of concentration. This process is extremely time consuming, however, and can only in part be automated. We completed and used two full databases of this type for our studies of the 2012 and 2016 elections; the process is not complete for many of the elections discussed in this paper, as we will discuss.

### 3. Linear models of congressional elections

Because this paper focuses on the effect of total expenditures on election outcomes, incompleteness of investor aggregation matters only in our concluding section, when we take up questions about investor bloc alignments.<sup>18</sup> For estimating the linear model itself, totals are decisive, so we spell out how we built up our data for this portion of the paper in Appendix 2. As we explain there, the data reports produced by the FEC have evolved markedly over time. In part, these changes arise from legislation and court rulings that redefine allowable forms of expenditure and receipts, but some also derive from changes in FEC reporting conventions. Among the latter, alterations in the way the FEC reports congressional campaign financing in 2008 and after are especially important. These make retrieving total expenditures harder: One has to ferret out money flows, such as different forms of independent expenditures and electioneering communications, that previously were reported more accessibly.<sup>19</sup>

Data compiled like this allows us to brush past artificial efforts to distinguish among different kinds of spending in Congressional races, such as “inside” vs. “outside” funds (that is, spent by candidate’s own election committee or by allegedly “independent” outside groups) or the spending of challengers or incumbents and directly test global hypotheses about political money and elections. We can pool all spending by and on behalf of candidates and then examine whether *relative*, not absolute, differences in total outlays are related to vote differentials. This way of attacking the problem, besides being intuitively sensible, makes it unnecessary to calculate

measures such as dollars per voter that are bound to differ widely across districts and have led to a proliferation of incommensurable measuring rods in the literature.

If conventional claims about the limited importance of political money are correct, then the individual data points – particular House or Senate election outcomes – should be scattered indifferently across a graph. Money just wouldn’t predict voting outcomes very well. If on the other hand, money is strongly associated with votes received, then the fit would approximate a straight line. All kinds of intermediate cases, of course, can be imagined.<sup>20</sup>

Fig. 1 shows the actual result for House elections in 2012. It displays a strongly linear relationship between Democratic candidates’ shares of total two-party spending in House elections and the percentage of major party votes they won. At the bottom left Democrats spend almost no money and get virtually no votes; at the top right, they spend nearly all the money and garner virtually all the ballots, calculated as proportions of totals for the major parties.<sup>21</sup>

Suspicious that this result was too good to be true, we ran a series of tests. Congressional districts exist in definite physical spaces at varying distances from each other and with likely spillover effects between neighbors. Though much of the literature on Congress brushes past this fact, such “spatial autocorrelation” can affect the accuracy of statistical estimates in much the same way temporal autocorrelation does in time series. We ran Moran tests to check. In House elections and some Senate contests we found that spatial autocorrelation was indeed present. We thus dropped ordinary least squares approaches to estimation in favor of spatial regressions. Usually these improved the fit, though not by much.<sup>22</sup>

House elections provide hundreds of observations for each election; our results for these, accordingly, were relatively robust. By constitutional design, however, Senate elections are far fewer and deliberately staggered; typically only a third of that body’s 100 seats are in play in a single election. Moreover Senate elections often involve highly visible, idiosyncratic characteristics of the candidates. This inevitably makes our results less tight and reduces statistical reliability. But the basic approach is once again vindicated, with the qualification that in Senate races the relation between money and votes appears to be somewhat looser than

<sup>20</sup> The votes measure is:  $[(\# \text{Dem Votes})/(\# \text{Dem Votes} + \# \text{Rep Votes})] - [(\# \text{Rep Votes})/(\# \text{Dem Votes} + \# \text{Rep Votes})]$ . That is, in plain English, a measure of the difference between the major party candidates, using the Democratic numbers as the base. For money, we capture all candidate disbursements of the two major parties (House and Senate) and all outside-the-candidate spending in the district/state that is known/measured.

a Pro DEM Money = DEM Disbursements + All Independent Expenditures For DEM + Communication Costs for DEM + All Party Coordinated Expenditures for DEM + Identified Electioneering for DEM  
b Against REP Money = All Independent Expenditures against REP + Communication Costs against REP + Identified Electioneering against REP  
c DEM % of Total Two Party Money =  
i  $[(\text{Pro DEM Money} + \text{Against REP Money}) / (\text{Pro DEM Money} + \text{Against DEM Money} + \text{Pro REP Money} + \text{Against REP Money})]$

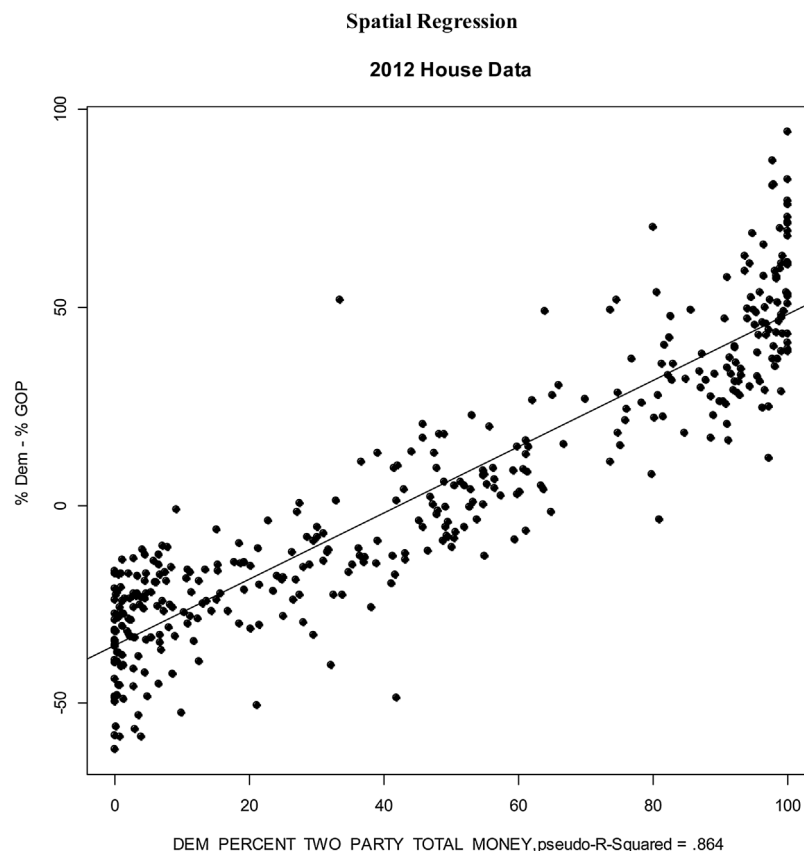
Note that this definition works for districts that have major parties competing. A very few states sometimes have run off elections in which several candidates of one party compete; these we do not include.

<sup>21</sup> Some earlier versions of our research showed a figure including cases in which major party candidates ran without any opposition from the other major party; this leads to an obvious pile up of residuals at each end. Our equation in this version of the paper drops cases with no major party challenger, reducing the bundling of residuals at each end (0 and 100). Nothing substantive changes.

<sup>22</sup> Political scientists unaccustomed to testing for spatial effects sometimes seize on the limited size of the effects to dismiss the whole exercise; but you can do this only after running the tests. In earlier work on other subjects, we have on rare occasions seen signs change. Other researchers who heeded our advice to run spatial regression on political donations sometimes find more substantive changes in their studies of money and votes.

<sup>18</sup> Note that this election cycle predated subsequent clashes between, for example, the U.S. Chamber of Commerce and the Tea Party. Those events we intend to treat separately.

<sup>19</sup> Depending on the precise year are in question, these forms of spending may reflect inflows from 527s or Super Pacs. If the money mentions specific candidates, they are supposed to show in that data. There is perhaps one form of expenditure that is not fully caught in our totals: issue ads that don’t name any candidate. We have not found it possible to identify these from 527 reports themselves; the detail usually is not there. We believe this form of expenditure is relatively exiguous by comparison with what we are able to identify.

**Fig. 1.** Spatial Regression.

See Table 1 for full summary statistics.

in the lower house.<sup>23</sup> Our conjecture was, and remains, that this is related to the differential press attention lavished on Senate elections.

Our reaction to all findings about political behavior is generally to wonder how far back in time the results can be extended, since we agree with Burnham that a broad historical approach is the royal road to real comprehension. Alas, as of now data of the type required for studies like ours go back only to 1980. Still, we thought, data on elections from those earlier years might be particularly interesting, because both elections and Congress itself functioned rather differently in the eighties than in the nineties or a fortiori, now.

Our first studies, however, revealed that not only in 1980, but also in 1996, essentially the same linear results for spending and vote shares held as in 2012. We now have compiled data for both the House and Senate in every election between 1980 and 2018 and estimated equations for all of them. Fig. 2 displays graphs of the House elections; Fig. 3 shows results for the Senate. Tables 1 and 2 set out the statistical results for elections in each chamber. They confirm that the patterns we found for 1980, 1996, and 2012 are not flukes. In all of them, our linear model works well. The ordinary least squares  $R^2$  measures are very strong; so are the Pseudo  $R^2$ s of the spatial models.<sup>24</sup> A partial exception are 1982 Senate elections – those elections have one outlier, Wisconsin. If that is removed, the results fall into line with the rest, though the  $R$ -Squared is a bit less than usual. Our Fig. 3 for Senate panels for that year show results

with the outlier, Senator William Proxmire.<sup>25</sup>) The conclusion has to be that spending by major political parties is indeed, at first sight, strongly related to the proportion of votes they win and it has been for as long as we have data. We consider this finding, in its own right, to be a significant result. If this pattern had been noticed a generation ago, discussions of politics and money might have taken a different turn.

#### 4. Saving the Appearances?

We are the first to admit that our evidence is not drawn from controlled experiments. But we also think waiting for these is a pipe dream: The cost would be enormous and, considering experimental review requirements now common in universities, would require substantial numbers of informed candidates willing to sacrifice their chances for election for the sake of knowledge as well as a sizeable group of billionaires interested in the same noble cause instead of controlling public policy.

A much more promising approach is to apply more sophisticated tests to the observational evidence we have. But we preface this effort with a general caution. As discussed below, one can envisage various ways to attempt to explain our results away. But the testimony of more than an entire generation of elections should itself be a warning that such efforts are likely quixotic.

The pattern's sheer uniformity is telling in its own right. It is hard to believe that the constancy over the length of time we have data for results from calculated responses ground out by politi-

<sup>23</sup> Spatial autocorrelation in Senate elections is also less common; see the discussion below.

<sup>24</sup> We use Nagelkerke's measure of Pseudo  $R^2$ ; while gratified the measures are high, we are cautious about all pseudo measures. Note that our spatial latent instrumental variable discussed below does not have an obvious Pseudo  $R^2$  counterpart.

<sup>25</sup> Proxmire prided himself on not needing to raise funds. It might be responded that with the state Farmer-Labor party of that era, perhaps it was unnecessary. But that is a problem for another essay.

## House Elections 1980 to 2018

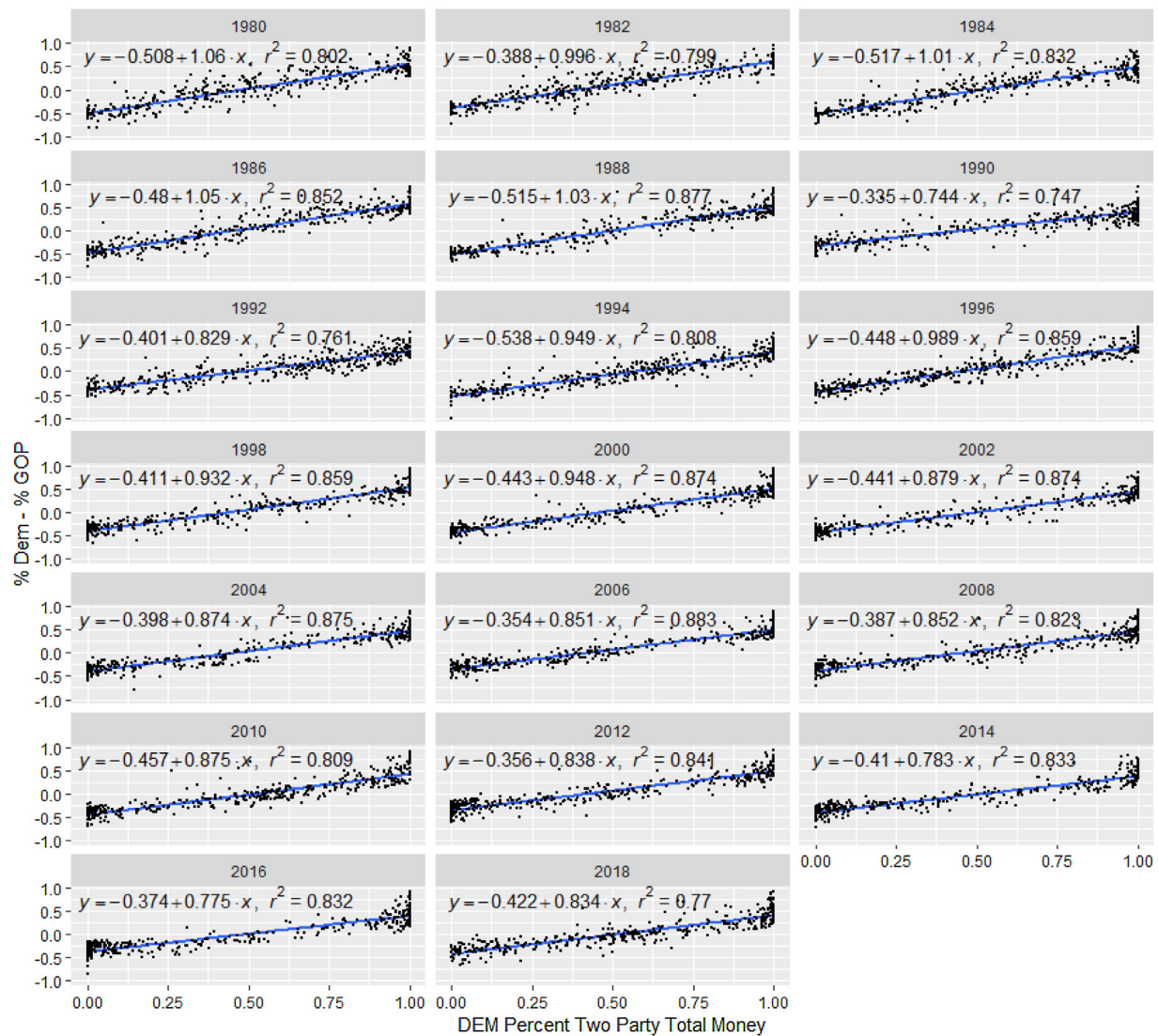


Fig. 2. House Elections 1980 to 2018.

cal parties and factions, no matter how supple. Over the last few decades, American political finance has evolved extensively into a more top-down process, in which giant blocs of investors organize nationwide and work steadily with (or against) a relative handful of national political leaders, who themselves plainly strive to emulate the consumption habits of their multi-millionaire backers.<sup>26</sup> But even now this system's degree of centralization can be overestimated, as our evidence about the divergent paths charted by different sectors in 2012 and 2016 and studies of earlier elections should forcibly remind everyone.<sup>27</sup>

In the 1980s and until at least 1994, by contrast, nothing approaching centralized fundraising machines with the capacity easily to move money around on the margins of national races existed. The closest things to these at the time were the phalanxes

of millionaires that swept first Reagan and then George H.W. Bush to power, but these efforts were centered on the White House. They extended only fitfully to the national parties as a whole, especially the one that did not hold down the White House. Machines capable of bankrolling a broad array of Congressional campaigns were little more than glimmers in the eye of New Democratic leaders like Charles Manatt or Republican insurgents such as Newt Gingrich, though Gingrich's efforts represented a quantum leap in this respect (Ferguson and Rogers, 1986; Ferguson, 2015; Ferguson and Rogers, 1981).

Neither party's Congressional flows of money probably ever approached the scale required to sustain the eerie regularities in our data. Especially given the inexactitude of real life, small sample polling done on the fly, and the infighting and disorganization that demonstrably attended so many campaign efforts then, not to mention the tendency of candidates to "over insure" their own campaigns, it is hard to accept that enough money could possibly follow polls so slavishly. Broadly and with sizeable lags, perhaps, but not to the degree suggested by the evidence. The requisite

<sup>26</sup> See (Ferguson, 1995) But especially (Ferguson, 2015).

<sup>27</sup> For earlier elections, see the discussion in (Ferguson, 1995); we also looked to see if Senate elections affected House races in states having the former, and did not find any effect.

## Senate Elections 1980 - 2018

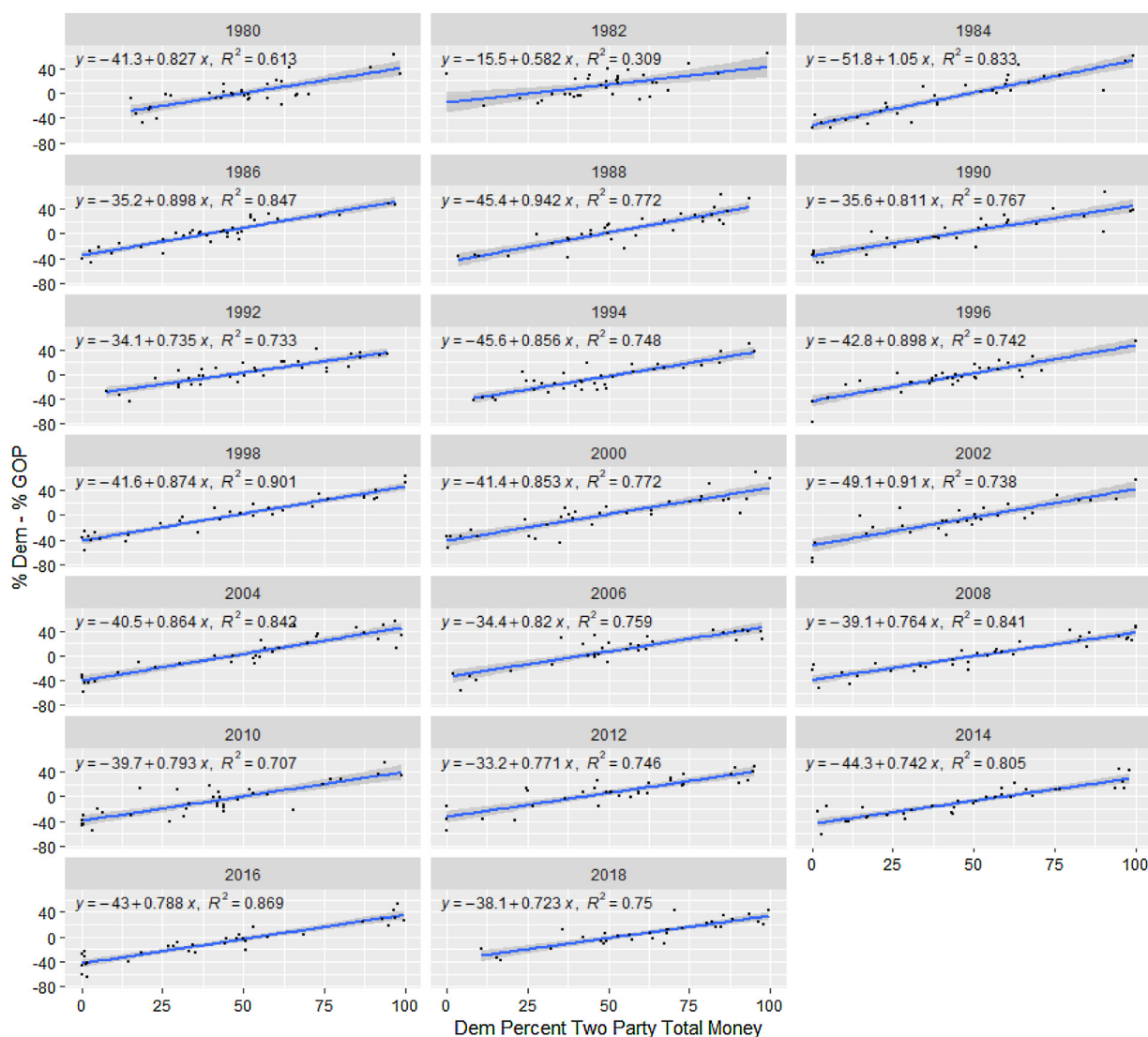


Fig. 3. Senate Elections 1980–2018.

servo-mechanisms simply did not exist. Neither the information nor the organizational capacity for such activities existed; at best one could read tea leaves early in the race, put out the begging bowls, and then hope for the best while hyping any and all good news. Even long after 1994, party leaders recognized that polls were incapable of producing tight predictions until, perhaps, the last few weeks of campaigns when they got a little better. They thus were uncertain trumpets for fundraising (Rove, 2010). And the relation between polls and seats in the House was only vaguely understood, becoming salient only after the 1994 shock of the Republican takeover of the House triggered a flurry of investigations.<sup>28</sup> In the final days of all election campaigns, certainly, many efforts to top up deserving candidates happened, but again mostly on an imperfect, decentralized basis, with fairly long lead times that we can see in the data.<sup>29</sup> Incumbents running for reelection also often showed

some tendencies to over-insure themselves, so that moving funds around to marginal districts faced real obstacles.

In at least two cases any form of automatic adjustment can be decisively rejected: 1994 and 2016. In 1994, Newt Gingrich and a bloc of Republican insurgents launched a sweeping effort to take control of the House of Representatives. They had been building up to this for at least a decade and there is no doubt at all that Gingrich and his fellow fundraisers extraordinaire, Haley Barbour and Phil Gramm (who was concentrating on the Senate) had deep ties to big business sectors that were by then on fire for sweeping deregulation and rolling back the whole New Deal regulatory state.<sup>30</sup> But here is the point: Though many chroniclers of retrospective history write the story by assuming its endpoint, at the outset Gingrich's quest to seize control of the House of Representatives was extensively a faith based operation. Even after he and his allies displaced the old House Republican leadership, hardly anyone thought they could actually do it, perhaps outside of the leaders themselves and

<sup>28</sup> See, e.g., the references and discussion in (Moore and Saad, 1997).

<sup>29</sup> It seems clear that the technology for mobilizing last minute funds has improved markedly, but we know of no systematic survey.

<sup>30</sup> (Ferguson, 2015) See also (Jorgensen, 2013).



**Table 1**

US House Elections Spatial Latent Instrumental Variable Model: Estimated Coefficients of Mean and Median for Predicting the Percent of the Vote: % Dem - % GOP of Two Party Vote.

Year	OLS Coefficients (SE)	Coefficients (SE Spatial Model)	SBLIV4 Median (95% CI)	Rsq/PseudoRsq	P V of Moran I Test	N
1980	1.062(.027)	1.049(.027) <sup>b</sup>	1.058(1.005,1.112)	.802/.809	.000	382
1982	.996(.026)	.975(.027) <sup>a</sup>	1.006(.955,1.055)	.799/.803	.042	376
1984	1.011(.024)	.989(.025) <sup>a</sup>	1.010(.962,1.058)	.832/.836	.009	365
1986	1.055(.023)	1.038(.024) <sup>a</sup>	1.051(1.005,1.098)	.852/.855	.027	361
1988	1.031(.021)	1.017(.021) <sup>a</sup>	1.028(.787,1.248)	.877/.879	.013	354
1990	.744(.023)	.729(.023) <sup>a</sup>	.746(.706,.787)	.747/.755	.015	350
1992	.829(.023)	.826(.024) <sup>b</sup>	.941(.790,1.174)	.761/.764	.009	400
1994	.949(.024)	.930(.024) <sup>a</sup>	.943(.890,.995)	.808/.814	.004	389
1996	.989(.020)	.937(.021) <sup>a</sup>	.960(.918,1.002)	.859/.870	.000	410
1998	.932(.021)	.900(.020) <sup>b</sup>	.900(.859,.942)	.859/.872	.000	341
2000	.948(.019)	.892(.019) <sup>a</sup>	.898(.861,.935)	.874/.893	.000	370
2002	.879(.018)	.858(.019) <sup>a</sup>	.868(.830,.905)	.874/.879	.001	354
2004	.874(.017)	.827(.018) <sup>a</sup>	.853(.819,.888)	.875/.889	.000	366
2006	.851(.016)	.825(.016) <sup>b</sup>	.832(.798,.866)	.883/.893	.000	374
2008	.852(.020)	.794(.020) <sup>c</sup>	.804(.764,.843)	.823/.848	.000	379
2010	.875(.021)	.803(.021) <sup>a</sup>	.789(.748,.832)	.809/.835	.000	406
2012	.838(.019)	.770(.019) <sup>a</sup>	.801(.762,.841)	.841/.864	.000	384
2014	.783(.019)	.732(.020) <sup>a</sup>	.747(.709,.785)	.833/.845	.000	357
2016	.775(.018)	.710(.018) <sup>c</sup>	.720(.684,.755)	.832/.867	.000	368
2018	.834(.023)	.707(.025) <sup>c</sup>	.737(.688,.793)	.770/.815	.000	391

Rsq/Nagelkerke Pseudo Rsq Statistic is for OLS or Spatial Model, As Applicable Not for SBLIV.

Note: A: Spatial Lag Model (SAR).

B: Spatial Error Mode (SER).

C: Spatial Durbin Model (SDM).

**Table 2**

US Senate Elections Spatial Latent Instrumental Variable Model: Estimated Coefficients of Mean and Median for Predicting the Percent of the Vote: % Dem - % GOP of Two Party Vote.

Year	OLS Coefficients (SE)	Spatial Model Coefficients(SE)	SBLIV3 Median (95% CI)	R-square	N
1980	.827		.835(.592,1.073)	.613	33
1982	.582(.156)		.582(.267,.895)	.309	33
1984	1.053(.086)	1.012(.065)	1.019(.900,1.140)	.833	32
1986	.898(.068)		.899(.762,1.033)	.847	34
1988	.942(.092)		.968(.775,1.152)	.772	33
1990	.811(.084)		.812(.640,.982)	.767	30
1992	.735(.078)		.735(.579,.892)	.733	34
1994	.856(.087)	.819(.073)	.835(.661,1.011)	.748(.774)	35
1996	.898(.094)		.897(.709,1.1083)	.742	34
1998	.874(.052)		.883(.774,.984)	.901	33
2000	.853(.083)		.856(.688,1.024)	.772	33
2002	.910(.103)		.913(.703,1.124)	.738	30
2004	.864(.068)	.864(.056)	.893(.640,1.352)	.842	32
2006	.820(.086)		.855(.641,1.085)	.759	31
2008	.764(.059)		.758(.402,.959)	.841	34
2010	.793(.089)	.736(.084)	.734(.559,.912)	.707(.739)	35
2012	.771(.081)		.786(.610,.964)	.746	33
2014	.742(.065)		.742(.624,.845)	.805	34
2016	.788(.055)	.760(.060)	.828(.708,.950)	.869(.873)	33
2018	.723(.075)		.750(.596,.904)	.750	33

Spatial autocorrelation not so prevalent in Senate elections.

Spatial latent instrumental variable model estimated only where tests indicated a need for it. Otherwise results for latent instrumental variable model are shown. Note that occasionally one or another state elected two Senators.

possibly including some of them. On the morning after the 1994 election, the sense of shock was profound and worldwide, extending for sure even to Gingrich's major financiers, who doubtless had hopes, but no realistic expectations, of victory on the scale they had just won.

One of us witnessed some of Gingrich's greatest donors reacting to the triumph and has never forgotten the joyous seismic astonishment that coursed through (some) suites on Wall Street in the days after. Newspaper coverage of the episode confirms the general sense of stupefaction. But there is no need to take anyone's word for this.

In recent years, growing resort to event studies and arguments about how information affects expectations has inspired

intense discussions within economics and finance about measuring judgments of probabilities and expectations. Within those fields a consensus has formed that published gambling odds are generally reliable indexes of expectations about generally perceived probabilities.<sup>31</sup> Early objections that vehicles like the Iowa Elec-

<sup>31</sup> (Snowberg et al., 2012) Note what is not claimed here: that gambling odds are superior to, say, polls, as predictors of elections or actually represent a perfect or near perfect way of aggregating information. We take the basic point of (Grossman and Stiglitz, 1980) and do not favor turning commonsense points about practical information handling into metaphysical claims about cognition. But we also accept that if that if any sizeable body of opinion expected, for example, a Republican victory in 1994, it would have leaked into the odds quotations; the same goes for "secret"

tronic Markets were too thin to be reliable and easily subject to manipulation have been investigated and rejected (Rhode and Strumpf, 2007, 2008; 2004). Some champions of this new approach to “information aggregation” have even suggested that such markets are superior to polls for forecasting elections.

To many researchers in other fields, such as political science, these claims often seem fantastic, especially when they are advanced as part of a larger case on behalf of free market fundamentalism and “perfect markets.” But we believe it is a big mistake to let the exaggerated claims distract from the real contributions of this research. As Wolfers and his colleagues have indicated, the evidence of fruitful application is abundant. Anyone familiar with the research should see that economics and finance have much to contribute here (Wolfers and Zitzewitz, 2004; Snowberg et al., 2012). While we flatly reject all forms of “rational expectations” arguments and the entire decision making theory that justifies it, we have no quarrel with the use of odds as evidence about consensus expectations.<sup>32</sup> They are superior to guesses, especially guesses by researchers who have not taken the time to immerse themselves in details. This does not mean that published odds, any more than polls – including aggregations of polls – are always right. They aren’t, as everyone who lived through 2016 should appreciate.<sup>33</sup> We simply advance the minimal claim that the odds are better than intuition about what observers as a whole expected.

Our data allows us to create daily totals of money flows on behalf of campaigns and parties.<sup>34</sup> These financial X-rays can then be compared with changes in the day to day odds of winning using a variety of statistical tools. But questions about appropriate lags and precisely what is assumed about contributors can often muddy results, since relative standings of the candidates over the course of the race often oscillate back and forth, making conclusive judgements about endogeneity at least contestable and in the worst cases perhaps undecidable.

But not all cases are that murky. If, for example, a candidate leads fairly consistently in the race, suspicions that some contributors may be donating at least in part because they want to go with the winner or perhaps buy some insurance are totally reasonable. Even if a candidate is not leading but simply rising in the polls over time or is not too far behind, the same holds true, especially if they have occasionally bounced into the lead; and particularly if they appear to be closing the gap in the final weeks of the campaign, though differing views about how donors balance desires to secure their ends as opposed to precautionary insurance motives may lead to alternative readings of the evidence (Chen et al., 2019).

But a sharp focus on the key condition Jacobson points to – “the expectation that a candidate can win votes” – provides a touch-

polls known only to party elites, though those can be ruled out on other grounds, since there were plenty of polls published that anyone could examine. Right to the end, for example, several ABC polls showed the Democrats ahead by substantial margins. See (Sherman, 2013).

<sup>32</sup> See the common sense approach to event analyses spelled out in (Epstein and Ferguson, 1991) or, less explicitly, in (Ferguson and Voth, 2008).

<sup>33</sup> Whether the presidential polls were really wrong in 2016 is a complicated question, since after all the candidate who won lost the popular vote. See the references and discussion in (Gelman, 2016) and (Ferguson et al., 2018b).

<sup>34</sup> Dates of contributions and expenditures are typically available in the data; it would be foolish to assert that no backdating or plain mistakes happen, but there is no reason to assume that these are substantial or systematic in most campaigns. Where falsification does happen it sometimes becomes obvious, to the point of becoming an object of public discussion. Money going through a chain of vehicles can, of course, make complications. See the discussion below of the 2016 Senate races. To obtain a picture of how much money was deployed to the benefit of candidates per day, we total contributions to candidate-controlled committees and to chamber-specific party organizations by the contribution date and then add to that total the daily tabulation of favorable expenditures by committees not controlled by the candidate, including but certainly not limited to super pacs. For the various categories of spending, please see Appendix 2.

stone to identify at least some races in which endogeneity must be minimal. To the extent that candidates sink steadily in the polls or trail hopelessly behind, especially in the final stages of the campaign, notions that major sums of money would come gushing in because donors think the candidate is likely to win are implausible. Such races are in effect natural experiments that can help sort out appearance from reality (Chen et al., 2019).

In the two cases of 1994 for the House and 2016 for the Senate, the evidence is clear cut. A widely used source for political campaign odds, the Iowa Electronics Markets, provides a complete series of contract quotations reflecting changing expectations for control of the House from early June 1994 down to Election Day. A one unit contract is priced in cents and pays \$1.00 if the Republicans win control of the chamber. Otherwise it pays nothing. (Normally bundles of these contracts are traded.) Prices thus reflect changing perceptions of the probability of a GOP victory. At the start of the campaign, the Democrats had held continuous control of the House of Representatives since 1955 and, indeed, with but two brief interruptions, since the 1932 election. Prices as the series began indicated that the probability of them retaining control was very high – sometimes as much as 95% – since a hundred dollars’ worth of contracts that would pay off in the event of a Republican victory could be purchased at very low prices. As Fig. 4 shows, after many months of campaigning and excited talk – that mostly attracted notice only afterward – about “Contracts with America,” that probability had budged hardly at all. Yes, there was a blip in the hopes for a Republican takeover – now the cost of a hundred dollars’ worth of contracts had risen to barely above \$20 dollars. The price hardly fluctuated during the rest of the race. Indeed, in the campaign’s closing stages, the likelihood of a Democratic victory appeared to be rising again. There was no shift big enough to justify a huge wave of late money based on the premise that an epoch making change in patterns of Congressional domination impended.<sup>35</sup> But such a wave did come – one far larger than in the previous off year election when the moderate Robert Michels led Republicans in the House.

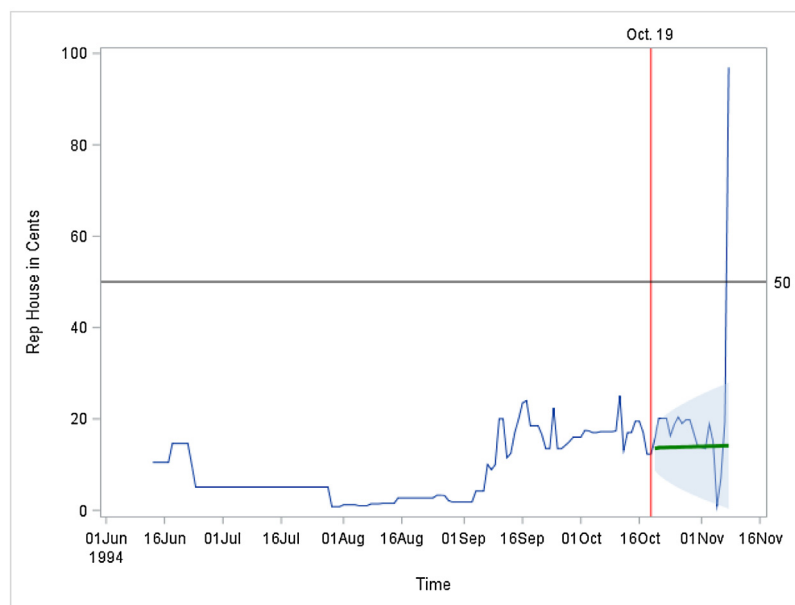
A feature of Fig. 4 illustrates this point graphically: Forecast models come in all shapes and sizes, but most vary only in degree. The figure uses a standard forecast model to project a full range of likely contract values (shown by the spreading “fan”) going forward based on the past behavior of the entire price series up to October 19, the day before a final great wave of campaign expenditures began.<sup>36</sup> Even the most generous range of forecasted values ran well below what was required to win – and reaching the very top of that range was, of course, even more improbable. The conclusion has to be that whatever was behind that wall of money, it cannot have been widespread expectations of an upset. But as we will see below, the mighty stream of money that came anyway produced a result consistent with what that our Bayesian spatial latent statistical model of money effects that corrects for endogeneity predicts (Fig. 5).<sup>37</sup>

<sup>35</sup> It is true that money often tends to rise a bit toward the close of campaigns, but the 1994 pattern is markedly different from 1990, the previous off year election. The “Postscript: The 1994 Explosion” in (Ferguson, 1995) correctly recognized that something unusual had occurred.

<sup>36</sup> Forecasting models depend on the data, in the sense that one tries to transform the data into a stationary series. We used an ARIMA (0,1,2) model with the series up to October 19 as the training data to project values after Oct. 19. The line shows the predicted value and the shaded “fan” area the 95% predicted confidence interval.

<sup>37</sup> See “Postscript: The 1994 Explosion,” in (Ferguson, 1995). Early polls that year were not promising for the Republicans, though after the money turned they improved substantially later in the campaign. By the end of the campaign, many, but not all, polls were showing a significant lead for the Republicans, which, rather like the polls before Brexit in 2016, were not really believed as the gambling odds testify. For a roundup of polls in 1994, see the roster in (Sherman, 2013). We have compared our daily expenditure figures during the campaign with the irregularly

## Iowa Market Prices for Contract on Republican Control of House – 1994



**Fig. 4.** Iowa Market Prices for Contract on Republican Control of House – 1994.  
Blue Line – Actual Contract Price.  
Red Vertical Line – October 19th, Day Before Large GOP Money Flows Commence.

The 2016 case is even starker. Fig. 6 plots the price of contracts paying off if the Republicans held on to the Senate. (Technically, the contract was for a Republican Senate and a Republican House. But since virtually no one thought the House would change hands, price variations reflect changes in expectations about the Senate.<sup>38</sup>) Republican hopes for retaining the upper chamber had fallen steadily since the campaign began, with only a handful of short lived bounces that never reached truly promising levels. Anyone looking for bandwagon effects would have been better advised to search for evidence of negative bandwagons – Republican donors defecting to the Democrats. After Labor Day, a traditional benchmark for taking stock in electoral match ups, prospects went mostly from bad to worse. A momentary blip upward at the end of September and the first days of October – to a level still well below anything but a long shot – was followed by another steep plunge. On October 8, a set of contracts that would pay \$100 in the event the Republican won the Senate sold for \$38. By October 17, the price had fallen to \$28, before accelerating almost into free fall. On October 25th, the price reached rock bottom: \$7.10 would buy contracts worth a \$100 if, somehow a miracle happened in barely two weeks. Republican Senate Leader Mitch McConnell and his allies were staring into the

abyss, amid brave talk of going down with guns blazing (Isenstadt, 2016; (Trojan, 2016).

By then the essential ingredient for such a miracle was rolling in. In flat defiance of the odds, wave after wave of big money poured in. Ever since early September, McConnell and his co-workers had been ringing alarm bells. As Fig. 7 indicates, despite the generally dismal prospects, the campaign made some very large expenditures toward the end of the month and early October. Still the rout resumed and donations to individual Republican Senators fell off. With both polls and contract prices suggesting that Donald Trump's presidential campaign was doomed, McConnell and Republican donors knew that only something extraordinary could save the Senate. As the few press accounts that noticed reported, "panicking GOP" Senate leaders embarked on a "last-ditch attempt to stop Donald Trump from dragging the entire GOP down with him" (Isenstadt, 2016). The Senate Majority Leader himself "sent up a flare" as outside spending groups run by his former chief of staff and individual Republican Senate candidates supplicated donors (Trojan, 2016).

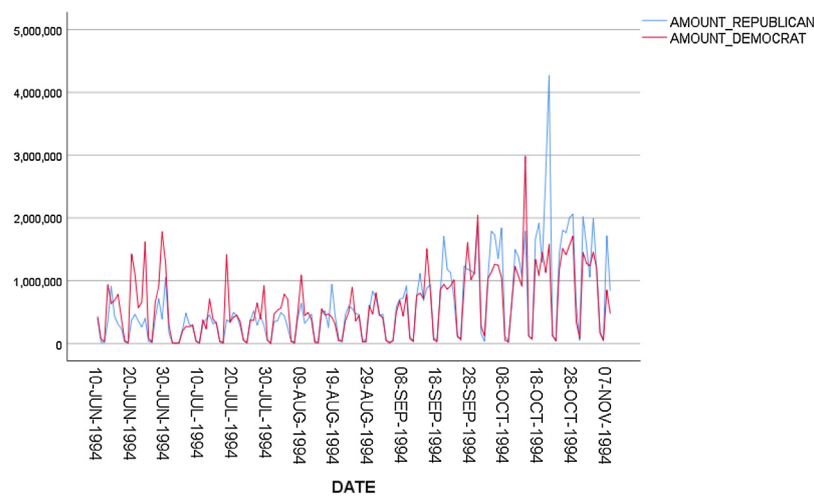
The response was phenomenal, as the few visibly impressed media accounts covering the developing story reported. After October 19, new rounds of first large and then enormous tranches of contributions poured in even as contract prices kept on going down. (Fig. 7 shows a daily file of total expenditures together with a forecast of contract prices based on the behavior of the entire series to Oct. 25th, when the contract price bottomed.) The inflow continued, eventually slackening off slightly, until the end of the campaign.<sup>39</sup>

published Gallup polls. There is no question the money flow led the polls for most of the campaign, including the great spike in late October, as our Figure shows. At the very end, after Gallup had switched to its likely voters samples, the polls caught up with the money, which is what should happen in a money-driven system. Here the case for some reciprocal causation is plausible, though the failure of the contract prices to follow the polls indicates widespread disbelief. Note that estimating exactly how much money could be endogenous would still be murky, but it is easy to identify stretches of the race in which a candidate's prospects looked bright enough according to the criteria mentioned earlier. If one simply stipulates that all of the money coming in at such time periods could be endogenous, then one can set a ceiling on the total. The point of our examples in 1994 and 2016 is that there are very few periods that qualify.

<sup>38</sup> We focus on the winner take all markets for control; in 2016, unlike 1994, there are contracts for combinations of party control. Prices for the various contracts involving Democratic control of the House attracted essentially no interest.

<sup>39</sup> The forecasting model in this case is an ARIMA (0,1,1) model, with the series before Oct 25 used as the training data to predict after Oct. 25. Note that a purely opportunistic wave of money should have grown continuously as polls and the odds turned up. This did not happen and is a further warning against overestimating the importance of the improving prospects. Note also that in 2016, unlike the 1994 House case, some Democratic candidates did try to counter the last minute money – which has no bearing on the question of the flood of Republican money coming in in defiance of the odds.

### Total Daily Expenditures, Both Major Parties 1994 House

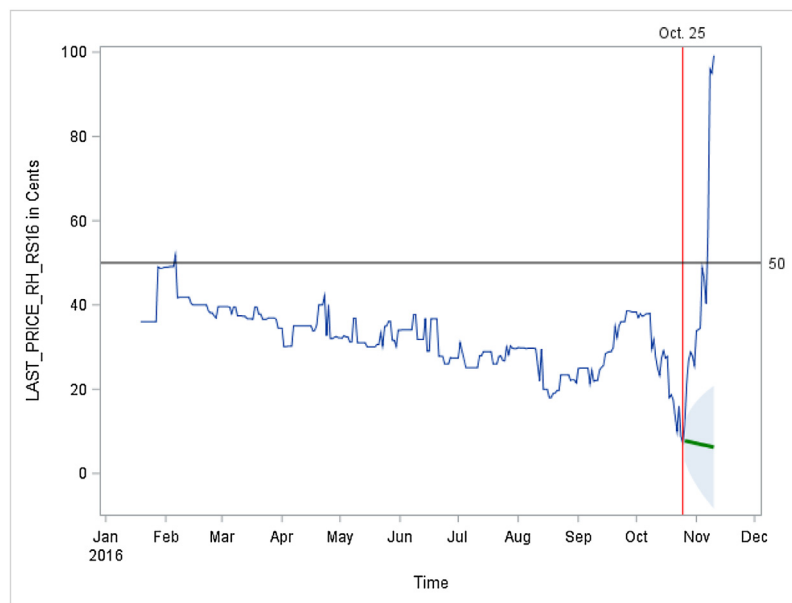


**Fig. 5.** Total Daily Expenditures, Both Major Parties 1994 House.

Source: See Text.

### Daily Price of Contract on Republican Senate Victory 2016

#### Fan Shows Forecast Values as of October 25 Bottom, Long After Waves of Late \$ Begin



**Fig. 6.** Daily Price of Contract on Republican Senate Victory 2016 Fan Shows Forecast Values as of October 25 Bottom, Long After Waves of Late \$ Begin.  
Blue Line – Contract Price.  
Red Vertical Line – October 25th.

We normally consider expenditures to be good rough guides to the pace of donations, especially as campaigns climax. But it is also clear from our data that political committees, like wolves, often travel in packs. Many, rather like banks accessing the inter-bank market for funds before the Lehman crisis, also pass donations back and forth. Especially with super pacs receiving inflows of Dark Money, nailing down who the contributors are and exactly when they donated is impossible – that is after all a major reason why so many super rich like super pacs. We therefore have taken pains to break out the separate inflows for the various Republican Senate funds, to rule out the possibility that

accumulated savings of incoming earlier money really saved the day.<sup>40</sup>

Dark money inflows there were for sure, especially from One Nation, a notably opaque funding source run by former aides to McConnell who made no bones about their proximity to the Republican Leader – or their desperation (Isenstadt, 2016; Troyan,

<sup>40</sup> Note, however, that this exercise bears only on claims about final donors. From the standpoint of testing the power of money to turn elections around, the key point is the spending itself. That is plain as day in the records.



Total Republican Senate Expenditures 2016

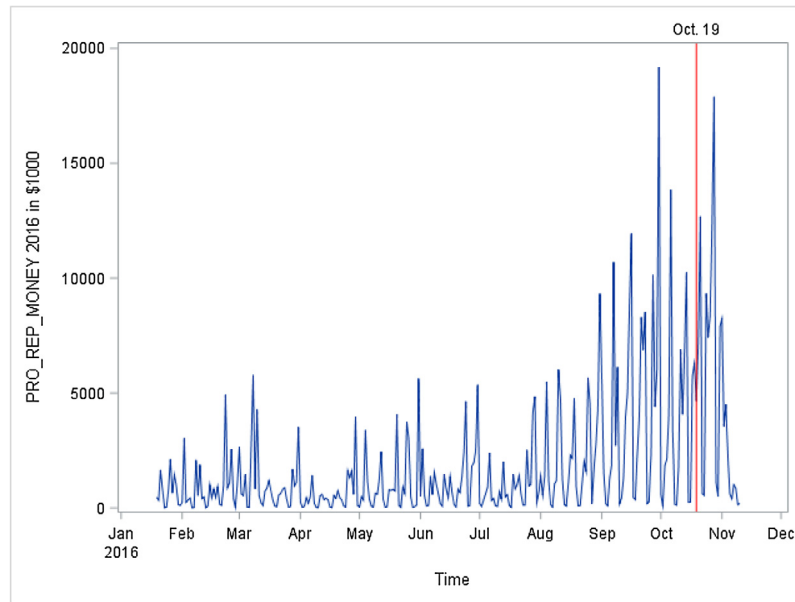


Fig. 7. Total Republican Senate Expenditures 2016.

Source: See Text.

Red Line – October 19 – Day before Closing \$ Waves Commence.

2016). Some other committees tapping untraceable funds also contributed, along with a few whose structures make dating contributions difficult. But the data suffice to demonstrate that enormous inflows really arrived at the Senate GOP's darkest hour, exactly as the few journalists who noticed reported. We have examined day by day cash inflows for the Senate Leadership Fund, the super pac run alongside One Nation by some of the same former McConnell aides. Its reports show some infusions from One Nation, but most of the money is straightforwardly sourced to many of the GOP's most celebrated donors, including Blackstone's Stephen Schwartzman (who contributed \$2,200,000 on October the 25th, after donating \$370,000 a week earlier; Sheldon and Miriam Adelson (listed as contributing \$7,500,000 each on the 24th; Paul Singer (\$2,000,000 on the 26th), numerous members of the DeVos family, and various oil companies and executives.<sup>41</sup> Contributions to individual Republican Senators also spiked again, even as catastrophe loomed. In barely three weeks, the GOP Senate money machine succeeded in turning around what looked like a hopeless situation. The conclusion has to be that in the Senate election of 2016 as in the House election of 1994, much money was mostly changing polls, not following them.

## 5. A more general approach: spatial latent instrumental variables

One could perhaps comb through details of other races to yield additional testimony, but published odds during most elections are

rarely so easy to interpret. The chances of getting bogged down in a thicket of particulars and ambiguous cases are high. It does not help that we disagree with many presuppositions that most mainstream election analysts tend to take for granted. That literature largely fails to develop a realistic assessment of the actual incentive structures in Congress and takes occasional pronouncements from individual representatives about how they dislike fundraising altogether too seriously. We also suspect that political science rankings of "quality challengers" really index the attractiveness of candidates to donors in slightly disguised form. Nor do we find it at all odd that candidates running unopposed should nevertheless often collect millions of dollars in donations for reasons that go well beyond deterring challenges, though that is certainly one way money talks in the political system. We also believe that the process by which issues develop and affect campaigns is misunderstood and complicated by the fact that variations in the amounts of time and money devoted to issues are difficult to assess. The complexity of possible paths back and forth between money and electoral outcomes makes it desirable to tackle the problem of reciprocal causality in very general terms.

At first sight, the problem is daunting. Jacobson's review lucidly summarizes the results of a generation of such efforts:

The problem was recognized early on (Jacobson, 1978; Welch, 1981) but after nearly three decades of work there is no agreed-upon solution. The standard technical fix-up is to use a two-stage procedure, in which instrumental variables "purged" of the effects of the reciprocally-related variables or of the component correlated with the omitted variables. The efficacy of this approach depends on finding exogenous variables that affect spending but not, directly, the vote (Johnston, 1972). This has proven difficult and the results remain inconclusive. Different choices of exogenous variables to identify the equations and compute the instruments produce a disconcerting variety of estimates of the relative effects of campaign spending by challengers and incumbents. Reported results from various two-stage (sometimes three-stage) models of campaign spending effects range from repetition of the OLS findings in which challenger spending has a large effect while incumbent

<sup>41</sup> (Blumenthal, 2017) lists many donors; our listing of dates and amounts comes from the official campaign reports. Note that the actual amounts of late money raised for the GOP Senate candidates ran substantially higher than the press stories suggested, since they, for good reasons, focused on a few vehicles especially close to McConnell. Our tabulations of campaign committees of individual Senators also show new inflows, though not as large as the vehicles close to McConnell's. As we noted in our study of the 2016 presidential election, this last minute wave of money to save the Senate coincided with a similar late torrent set loose by the Trump campaign, including the candidate himself, whose total contributions including loans in the end far outpaced that of Mitt Romney, who had headed the ticket in 2012. See (Ferguson et al., 2018b).

spending has no effect at all on the vote (Jacobson, 1978, 1980, 1985), to estimates suggesting that spending by incumbents is as least as productive as spending by challengers (Green and Krasno, 1988, 1990; Grier, 1991; Ansolabehere and Snyder, 1996; Gerber, 1998), with others falling in between (Bartels, 1991; Goidel and Gross, 1994). Alternative approaches produce an even broader range of results from evidence that neither candidate's spending matters much (Levitt, 1994) to evidence that the incumbent's spending may be equally or more productive than the challenger's spending (Goldstein and Freedman, 2000; Erikson and Palfrey, 1998), with others again taking the middle ground that incumbents do help themselves by spending money on campaigns, but with a lower marginal rate of return on their investment than challengers (Box-Steffensmeier, 1992; Kenny and McBurnett, 1997; Coates, 1994). (Jacobson, 2006).

As Jacobson indicates most efforts to resolve this problem rely on some instrumental variable, though a few researchers have tried other approaches, including Jacobson himself, who introduced a very interesting panel approach in the article containing this passage. The difficulty is that the technical requirements for instrumental variables are exigent; instruments need to be correlated with the original variable of interest, but not with the error in the new equation constructed using them (Stock and Watson, 2010; Park and Gupta, 2012). We are skeptical about finding much in this world that is correlated with campaign money but is absolutely unaffected by chances of winning or other factors that would infect the error term. The myriad contrasting results researchers report only reinforce our skepticism.

We therefore searched for an approach that would make a virtue of ignorance and looked for methods relying on latent instrumental variables, that is, variables that are unknown to the researchers. Such methods exist; they have been developed by Ebbes and colleagues and are now widely used with apparent success in applications in business and economics.<sup>42</sup> Where their results have been compared with well-established previous findings where conventional approaches are more justifiable, such as the results of investigations of earnings to schooling (where the latent variable is ability) they have produced answers similar to the previous studies (Ebbes et al., 2005; but especially Hueter, 2016).

Much of our data, however, is spatially autocorrelated – this is all but inevitable when individual districts adjoin others. Existing latent instrumental variable models usually rely on ordinary least squares for their estimation and assume that errors are uncorrelated temporally and spatially. They thus require modification. We have developed a spatial latent instrumental variable model that we can estimate using Bayesian methods. Appendix I presents the details of the model; Tables 1 and 2 present our results. Table 1 summarizes findings for the House; Table 2 for the Senate.

Statistical tests show that the spatial latent instrumental variable model is needed for all House elections; all years display significant spatial autocorrelation. By contrast, that is true of fewer Senate elections – not surprisingly, since by constitutional design many states hold no election at all in any given year. Correcting for spatial autocorrelation typically reduces coefficients of money's impact, whereas use of the latent instrumental model raises them back up somewhat. Where a spatial model is not necessary, the entries in our tables for the latent instrumental variable equation use ordinary least squares to estimate effects.

The coefficients for the political money term in Tables 1 and 2 thus represent our best estimates of the true value of the way money drives elections. The basic finding is sobering: the coefficients on money always remain strong, even with the latent

instrumental variable control. No less interestingly, for the House races in 1994 and the Senate contests of 2016, the latent instrumental variable model produces estimates that are in line with our independent assessment discussed above that endogeneity in those elections could not bulk large. The two very different approaches yield roughly similar results. Our conclusion, which of course should be subjected to further scrutiny, is that seeing should, after all, be believing: the case in favor of the proposition that money drives US elections is significantly strengthened. The endless arguments about cause and effect in money and politics should perhaps, enter a new stage, with, we hope, the optics changed forever. We do not doubt that reverse causality happens, but money flows should be regarded as powerful factors in their own right.

## 6. Corporations holding the center?

Our previously reported analyses of campaign financing in the presidential elections of 2012 and 2016 showed that both major parties in the United States were heavily dependent on contributions from the very wealthiest Americans – the famous 1% (Ferguson et al., 2013, 2018b). Within that group, though, substantial differences existed between investors (and companies controlled by them) within and between various sectors and lines of business. These differences are easy to document once one has the data and they found clear expression between the parties and various blocs inside them, in both 2012 and 2016. The heavy concentration of polluting industries behind the 2012 Romney campaign, for example, is hard to miss (Ferguson et al., 2013). Or the weight of leading private equity firms in the later stages of the Trump campaign in 2016 (Ferguson et al., 2018b).

But from the outset we recognized that organized labor is also politically active and sometimes makes substantial political contributions as part of broader efforts to influence politics. Yet U.S. labor has clearly been declining for more than a generation. In 2016, labor commanded only about 7% of the \$8 billion plus entering into the 2016 election (Ferguson et al., 2018a).<sup>43</sup> Until recently this could be taken as perhaps the best single quantitative index of the extent of “countervailing power” within the American system.

But once in a while there is something new under the sun. In the past we have dismissed claims about the importance of small donations as the bedrock of any but losing campaigns. That generalization remains largely intact, but it is only fair to note that since the Sanders presidential campaign of 2016 a substantial wing of the Democratic Party has emerged that is highly critical of the Party's dependence on big finance. Because we sift through and aggregate contributions not only from the FEC, but the IRS (which reports so-called “527” money that both journalists and scholars typically ignore), we are able to pin down fairly precise measures of candidates' dependence on large donations.

Fig. 8 shows something remarkable: a powerful bid for the presidency floated completely by small donors. The figure underscores

<sup>43</sup> Assessing changes in labor's role in financing Democrats over time is difficult. Data of the quality that we rely on in this paper are currently available from the Federal Election Commission website data only from 1980, though earlier data of varying standards exists. But labor's decline set in well before 1980, making that year a poor benchmark for judging changes from the New Deal era. Indeed, Democrats in Congress had already changed the laws to encourage business giving to the party when they realized labor could not deliver money in the amounts they sought (Wright, 2000). Nevertheless, we have examined that 1980 data carefully. The broad outlines of labor's situation are clear, but as some analysts noted at the time, details of some campaign expenditures remain fuzzy (Alexander and Hagerty, 1983) and later discussion has raised questions about a few totals, notably so-called “soft money.” We will publish separately on the details of our calculations, but we estimate that organized labor's total spending in Congressional elections amounted to about 5.5 percent of all spending and about 7% of all presidential spending – not all that different from today.

<sup>42</sup> See the references above.

## Size of Contributions: Profiles of American Political Leaders, 2016 Cycle

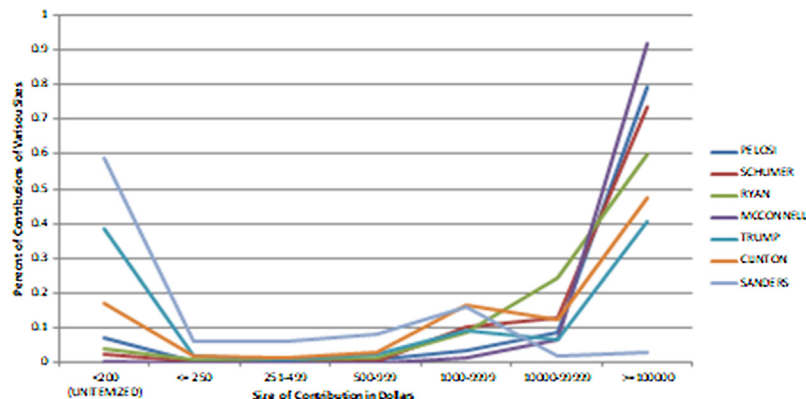


Fig. 8. Size of contributions: Profiles of American Political Leaders, 2016 Cycle.

Source: Authors' calculations based on FEC and IRS data; see text.

a point that bears repeating in light of the burgeoning literature on “populism” that applies the label indifferently to both Trump and Sanders. For all the small donations he attracted, Trump’s financing came mostly from the top down; Sanders’ campaign, by contrast, was as close to a purely bottom up effort as one is ever likely to see. It makes little sense to assimilate these two forms of populism, with their radically different attitudes toward racial minorities, the rights of women, or LGBT people. And the figure provides a vivid warning of what approaches to political spending that simply focus on totals, with no regard for the average size of donations or where these come from, inevitably miss. Political systems and candidates cannot be treated as pure expressions of aggregate income distributions, even when the long shadow of changing income distributions looms over everything in the campaign. The same holds for efforts to analyze political dynamics in terms of inter-industry dependencies. Their role will be conditioned, as the investment approach always emphasized, on the mobilization rate of the social classes and other groups making up the electorate and how active they are (Ferguson, 1995).

There is no reason to get carried away. The figure raises interesting questions about what might be changing in American politics, but, after all, in 2016 Sanders did not win, though his remarkable run has few parallels in American history.<sup>44</sup> The graph does show that two souls are now at war in the Democratic Party: Large groups of aroused small donors versus what can be termed a Democratic establishment dependent on big money from the 1%. Read together with the tables in our other papers that analyze big business contributions to the parties in 2012 and 2016, the finding raises a yellow flag to claims recently advanced by, for example, Thomas Piketty, that present day party competition is defined by struggles between right wing business parties and left oriented major parties representing highly educated voters.<sup>45</sup> Our data demonstrate conclusively that big money figures massively in both major American parties. It is a generalization that we believe likely applies in many other countries; we note that initially skeptical authors of a study of parliamentary and local elections in France who were familiar with our earlier work discovered that linear models fit their data, too (Bekkouche and Cagé, 2018).

That said, there is yet another widely propagated claim about American political money that requires a word. This is the idea that the political system’s steady lurch to the right since the late nineteen sixties is somehow the work of rogue right wing billionaires while large American corporations tend to the political center.<sup>46</sup> The assertion is easy to test and refute with our data that relates individuals and corporations to each other.

We doubt the validity of existing scales that purport to measure how far left or right major investors and corporations are in their political giving.<sup>47</sup> But there are some distinctions that we accept as unproblematic. We certainly consider Tea Party Republicans to be a distinctive group with in the GOP and located well to the right of the rest of the party. A fortiori, as a group, they sit well to the right of the Democrats.

In the Trump era, the Tea Party’s relationship with the rest of the Republican Party and with the business community has been changing rapidly. Even within the GOP, the Tea Party has come under fire and parts of big business, including the United States Chamber of Commerce, have become openly antagonistic.

But it did not start out this way, though in the future many some analysts may wish to bury this point. A simple test is very illuminating. If it is true, as often suggested, that at the start Tea Party backers disproportionately represented eccentric billionaires rather than major American corporations, then rates of support for the Tea Party should have been proportionately higher among the Forbes 400 richest Americans than the rest of big business (defined as the largest 350 firms in the Fortune list and equivalently sized private firms not included on that list). Our data for individual contributors allows us to test this directly for the 2012 election, when despite some tensions, the Tea Party was still going strong.

Once again, the results surprise even us: At that time the largest American firms were far more likely to support Tea Party Congressional candidates and organizations that support the movement,

<sup>44</sup> See the discussion of the Sanders campaign in (Ferguson et al., 2018b).

<sup>45</sup> (Piketty, 2018); for tables breaking down Clinton, Trump, and other candidates by sectors, see Ferguson et al. 2018b); for 2012, a very clear cut case, (Ferguson et al., 2013).

<sup>46</sup> (Bonica, 2013); (Drutman, 2015). Some claims about the Kochs could also be taken that way. We regard a focus on any particular group of large contributors to the exclusion of the rest of that exalted universe as the royal way to misunderstanding.

<sup>47</sup> For some objections, see, e.g., (Page et al., 2018); our reservations, though, are more fundamental. The whole question looks different when one groups individuals with their firms more consistently.

**Table 3**  
Support for Tea Party Candidates: Superrich Investors vs. America's Largest Businesses (N = 774).

Superrich Investors vs. America's Largest Businesses	Support for Tea Party Candidates
Big Business Firms and Forbes 400 Members Combined	51%
Big Businesses Without Forbes 400 Forbes 400 Members	78%
	24%

such as Freedom Works.<sup>48</sup> Billionaires on the Forbes List, by contrast, were about half as likely (Table 3).

These results might be qualified in various ways, but their general point is clear: Stories that the steady rightward drift of the American political universe has been somehow the work of exceptionally ideological individual entrepreneurs are grotesque over-simplifications. If the center is not holding in American society – and it rather plainly is not – America's largest companies are as implicated as anyone else; indeed, perhaps more so.

## 7. Conclusion: recognizing a money-driven political system

In the last generation the center of gravity of American politics has shifted dramatically. Income inequality has soared and the system has become so dysfunctional that even many affluent voters are in revolt, as racial and ethnic cleavages are intensified by economic breakdown.<sup>49</sup> Statistical studies of the subset of public policies that have drawn enough long term attention from pollsters to permit tests show that ordinary Americans have essentially no influence on public policy when their preferences run counter to those of the rich (Gilens, 2012; Gilens and Page, 2014). The few direct studies of opinions of the super-rich also show they are far more conservative on most economic issues than the rest of the population (Page et al., 2018). Not surprisingly, when economists compare actual public policies bearing on inequality with those that would benefit average Americans they now often summarily reject older “median voter” approaches to understanding politics. They thus close ranks with most Americans, who have long since drawn that conclusion.

We think it is time that social scientists stop pushing the equivalent of the Ptolemaic solar system. They need to recognize what almost everyone else does: that we live in a money-driven political system. No one is going to make progress by adding epicycles to voting models.<sup>50</sup> We are the first to admit that our paper employs a new approach to treating the instrumental variable problem. But if this novelty raises doubts, it should be reassuring that we are able to check its conclusions by entirely different methods that are now routine within economics and finance. We think at a minimum our results should shift the burden of proof. Again, the evidence we have amassed should change the optics of the whole discussion:

<sup>48</sup> This definition is different from the tests reported in (Ferguson et al., 2013) That used a narrower definition that excluded organizations like Freedom Works in favor of support for candidates' campaign and leadership committees. Of course it, too, showed important support for the Tea Party from major American companies, as we said plainly. Note that our test does not count contributions given indirectly by companies through vehicles like the U.S. Chamber of Commerce. We focus on direct contributions coming from executives, the company itself, or its political action committees in the full range of ways earlier discussed.

<sup>49</sup> As witness the Trump and Sanders candidacies in the 2016 election.

<sup>50</sup> A fine example of adding epicycles is the practice of announcing, after elaborate statistical analyses, that elected representatives represent voters in their districts at some specified level of affluence, say the top thirty percent of incomes. This misses a point we will elaborate in the future: enormous amounts of money now comes from outside districts and states. The key to understanding national politicians such as Harry Reid or Mitch McConnell is usually in New York or some other super affluent jurisdiction, not their own.

the association on its face between money and election outcomes is very strong. In one offs, such as presidential elections, the pattern may be harder to see, but where cases are numerous, as in House and Senate elections, the association becomes visible immediately, if researchers only take the trouble to look.

It goes without saying that this news is not reassuring in terms of democratic values: Particularly in elections below the federal level – in states and local elections, we suspect that money has come to dominate outcomes to a frightening degree, not least because it is unlikely that the Republican advantage is offset there to the degree that it has been in recent federal elections.<sup>51</sup> If it turns out that the US has entered a Post-Democratic age, the situation will not be improved by social scientists behaving like ostriches. It is time economics, political science, and history recognize the reality of industrial and financial blocs within parties and acknowledge money's powerful effects on elections.

## Acknowledgements

The authors are grateful to Benjamin Page for exceptionally helpful comments on both the first and the revised versions of the paper. We would also like to thank Francis Bator, Walter Dean Burnham, Andrew Gelman, Irene Hueter, and Peter Temin for discussions of earlier versions. We are also grateful to Peter Ebbes for swift replies to queries and assistance with programming and technical questions. We also benefitted from the comments of several referees for this journal and from the editors of the special issue. The authors are grateful for support from the Institute for New Economic Thinking Grant # INO15-00041 to Jorgensen for work on the database, but the paper represents the views of the authors, not of any institutions with which they are affiliated. Jorgensen is also grateful for support from the Edmond J. Safra Center for Ethics at Harvard University, where he was a Fellow. Early versions of this paper was presented at plenary conferences of the Institute for New Economic Thinking in Hong Kong and Paris and later issued as an INET working paper. The entire Political Money Project database for this essay is to be freely available to the public when work on it is completed.

## Appendix I

### The Formal Model

This paper relies on much new data compiled from the Federal Election Commission and the U.S. Internal Revenue Service and employs a variety of statistical models to analyze these. We discuss this data at some length in our main text and more formally in Appendix 2. This Appendix presents our statistical models in detail. We specify full, formal models, in what we hope is an accessible fashion.

Our main models concern House districts and states with elections for the Senate. These all occupy definite areas in space, with some adjacent to each other. This poses a potential problem for statistical analysis, because the strong resemblances between neighboring areas mean that all those observations may not in fact be independent in a statistical sense; they might contain less information than a set of independent observations would. This spatial autocorrelation, rather like the better known case of temporal autocorrelation, can distort statistical estimates.

Though many studies of Congressional elections do not bother to test for the presence of spatial autocorrelation, we think this is a bad procedure. Often it is true, the differences between spatial

<sup>51</sup> A senior political consultant observes to us that our results imply that the number of potentially contestable elections is markedly wider than commonly supposed. The prospect is not reassuring.



regressions and ordinary least squares (OLS) are not huge, but this needs to be shown, not assumed.

In our previous work on Congress, we have tested for the presence of spatial autocorrelation, typically by running Moran's I tests (Moran 1950 and Cliff and Ord 1981). This time, as usual, both map plots of the dependent variable of the percentage of Democratic votes as well as the residuals of the Ordinary Least Squares (OLS) regressions often showed clear signs of spatial autocorrelation.

This spatial autocorrelation complicates our treatment of endogeneity in the independent variables. As we outline in the text, our paper tackles this classic problem head on by developing a spatial version of the latent instrumental variable (LIV) analysis proposed by Ebbes and his coworkers. The method has been used by some researchers, but it is not yet widely appreciated in political science, economics, or sociology. Irene Hueter's comprehensive review of the LIV (including an earlier version of this paper) method should help greatly to make it more widely understood.<sup>52</sup>

We cannot hope to substitute for her much more detailed treatment, but we want to clearly specify what we did in our paper. We follow Ebbes' lead to develop a spatial regression model with Latent Instrumental Variables using a Bayesian approach.<sup>53</sup> This spatial Bayesian latent instrumental variable (SBLIV) method, in contrast to the usual way of tackling endogeneity, does not require the availability of "external" instrumental variables and takes account of spatial dependencies that exist between adjacent observations.

Formally, let  $Y_i$ ,  $i = 1, \dots, N$  (where  $N$  is the number of districts) be the dependent variable, which is the difference between the Democratic and Republican vote as a percent of all votes for the two major parties, and  $X_i$  be the endogenous regressor, which is money favoring Democrats as a percent of all money spent on or by the two major parties.<sup>54</sup> Then the SBLIV model is defined as the following:

$$\begin{aligned} Y_i &= \beta_0 + \beta_1 X_i + b_i + \varepsilon_i \\ X_i &= \theta_i + \nu_i \\ b_i | b_{j \neq i} &\sim N(\bar{b}_i, \sigma_b^2 / m_i) \end{aligned} \quad (1)$$

Where,  $b_i$  captures district clustering via a Conditional Autoregressive (CAR) model,

$\bar{b}_i = \frac{1}{m_i} \sum_{j \neq i}^n b_j$ ,  $m_i$  is the number of neighbors of district  $i$ , with  $b_j = 1$ , if  $j$  and  $i$  are neighbors and 0 otherwise.  $X_i$ , the independent variable, is split into an exogenous part  $\theta_i$  and an endogenous part  $\nu_i$  where  $\nu_i$  is assumed to have a mean of zero and a variance  $\sigma_\nu^2$ . The error terms  $\varepsilon_i$  are independently and identically distributed across districts with zero mean and variance  $\sigma_\varepsilon^2$ . It is also assumed that  $\nu_i$  and  $\varepsilon_i$  are correlated with the covariance matrix as:

$$\Sigma = \begin{bmatrix} \sigma_\nu^2 & \sigma_{\varepsilon\nu} \\ \sigma_{\varepsilon\nu} & \sigma_\varepsilon^2 \end{bmatrix}$$

We follow the same approach as in Ebbes (2009) to assume there is linear projection between the structural error  $\varepsilon_i$  and the reduced form error  $\nu_i$  as:

$$\varepsilon_i = \rho_i \nu_i + u_i$$

So Eq. (1) is reduced to:

$$Y_i = \beta_0 + \beta_1 X_i + b_i + \rho_i \nu_i + u_i \quad (2)$$

Where,  $\rho = E(\varepsilon_i \nu_i) / E(\nu_i^2)$ , and  $E(\nu_i u_i) = 0$ . The covariate  $X_i$  is endogenous when  $E[\varepsilon_i \nu_i] \neq 0$ , in which case traditional inferential techniques are biased and inconsistent. If  $\theta_i$  is observed as in the standard IV case, the estimators are unbiased and consistent. However, if the observed instrumental variables are poor proxies for the instrument  $\theta_i$ , they exhibit a poor correlation that results in dependency between  $\theta_i$  and  $\varepsilon_i$ .

Ebbes' method at least up to now has not been extended to include continuous endogenous variables. The method instead slices the endogenous variable into a set of categories; the method, as Hueter explains, is not very sensitive to the precise number researchers employ. In simulations we have experimented with various numbers of categories, but get essentially the same results.

In the above equation,  $\theta_i$  is the unobserved instrumental variable with  $L$  support points  $\pi_1, \dots, \pi_L$  that define the categories with probabilities  $\lambda_1, \dots, \lambda_L$  where each  $\pi_l$ ;  $l = 1 : L$  has a normal prior with mean  $a_l$  and precision parameter  $\tau_l$ ,  $\pi_l \sim N(a_l, \tau_l)$ , and each  $\lambda_l$  has a Dirichlet prior  $\lambda \sim \text{Dirichlet}(\alpha)$ . (The Dirichlet prior is necessary because of the categorical form.) From Ebbes (2005) Equation (7.10) it can be seen that the full conditional posterior distribution of  $\theta_i$  is a mixture of a normal distribution and a discrete distribution with weights on the distinct values according to the probability of  $\lambda$ . For example of  $L = 4$ ,

$$\theta_i \sim \lambda_1 \pi_1 + \lambda_2 \pi_2 + \lambda_3 \pi_3 + \lambda_4 \pi_4$$

will be estimated from the data using a Bayesian approach with standard, conjugate priors for  $\beta_0$ ,  $\beta_1$ , and  $\rho$ ,

$$\beta_0, \beta_1 \text{ and } \rho \sim N(0, 1/1000).$$

## Appendix 2

### Campaign Finance Data Sources

We calculate total spending for major party candidates campaigning for the U.S. House of Representatives and U.S. Senate from 1980 through 2018 using different data files originally gathered by the Federal Election Commission (FEC) and by the Internal Revenue Service (IRS) for the occasional candidate-linked 527 committee from 2002 to 2018. The different spending categories we are able to link to candidates include: candidate disbursements, party coordinated expenditures, independent expenditures for and against from all sources, and electioneering communications (advertisements aired close to an election, but stop short of being categorized as express advocacy for or against a candidate). Since our time frame is nearly 40 years, legislation and court cases changed the nature of spending and the FEC changed its disclosure of that spending over time.

From 1980 through 2006, we use the candidate campaign-finance summary files that the FEC named CANSUM. We accessed these files using the file transfer protocol (FTP) for the FEC's legacy website (the FEC updated its website during publication). We established an FTP connection using <ftp://ftp.fec.gov/>. The FEC replaced CANSUM with the Data Catalog, which is now located on the FEC's legacy site, accessed here: <https://classic.fec.gov/data/DataCatalog.do?format=html>. The Data Catalog's Candidate Summary file has limited utility for our calculation of total spending, and only contains the category of total candidate disbursements. To obtain dollar

<sup>52</sup> (Hueter, 2016).

<sup>53</sup> Cf. Hueter on some advantages of using a Bayesian approach in settings like our's and the discussion of Ebbes and colleagues in the text.

<sup>54</sup> In symbols, the dependent variable is [% Dem Vote - % Rep Vote] / [Total Dem plus Rep Vote], which as the text indicates will be negative when Democrats lose the election. The endogenous regressor  $X_i$ , the money variable is [All Money Favoring Dems] / [All Money Favoring Dem + All Money Favoring Rep]. If money was spent against the Republican, then that would go in the Favoring Dem category and vice versa.

amounts for the other spending categories, we aggregated the appropriate transactions (Itemized Trans. Codes in the table below) from the FEC's itemized data files (named ITOTH). The itemized files are accessible here: <https://www.fec.gov/data/browse-data/?tab=bulk-data>. We then compared that information to the Data Catalog's separate datasets for Communication Costs, Independent Expenditures, and Electioneering Communications to determine the most accurate dollar amounts (being careful not to double count since the amended reports are lumped together with the original reports). We labeled electioneering-communication transactions as for or against candidates using news reports to identify the group and the particular transactions in some cases.

To complicate matters, the FEC maintains a campaign-finance summary file for each candidate that is separate from CANSUM (discontinued) and the Data Catalog (only located on the legacy FEC website). It is called the All Candidates file, which on the legacy website was named WEBALL. It is now located here: <https://www.fec.gov/campaign-finance-data/all-candidates-file-description/>. The FEC has replaced all the old CANSUM files with the All Candidate files for consistency, making it more difficult to access candidate totals for many spending categories. We accessed all of these files from 1980 to 2018, and much to our surprise, the total candidate disbursement information in these files differed somewhat from the other candidate summary files claiming to report the same information. After contacting the FEC over the discrepancy, our conclusion is that none of these datasets have an obvious claim to better describe the reality of total candidate disbursements. The discrepancies between them are nearly always minute. We checked to see how the results of our model change if one uses the All Candidates file (WEBALL on the FEC's legacy website) instead; the answer was that the fit changed minutely. We accordingly have gone ahead and used the data described in the table below. We do not believe any substantial differences will turn up no matter which data file one uses to calculate total spending.

Spending Type	Election Cycles	FEC Data Source	Itemized Trans. Codes
Total Candidate Disbursements	1980–2006	CANSUM	
Party	2008–2018	Data Catalog	
Coordinated Expenditures	1980–2006	CANSUM	
Ind. Expenditures	2008–2018	ITOTH	24C
For/Against	2008–2018	CANSUM	24E/24A
Communication Costs For/Against	2008–2018	Data Catalog	
	1980–2006	CANSUM	24F/24N
	2008–2018	ITOTH	
	2008–2018	Data Catalog	
Non-Party Ind. Expenditures For/Against	1980–2006	CANSUM	
Party Ind. Expenditures For/Against	1996–2006	CANSUM	
Electioneering For/Against	2004–2018	ITOTH	29
	2008–2018	Data Catalog	

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